

Smart Marine ecosystem approach

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Overcapacity

Fuel efficiency

**Waiting time
in terminals**



**Shared
capacity**



**Big data
analytics**

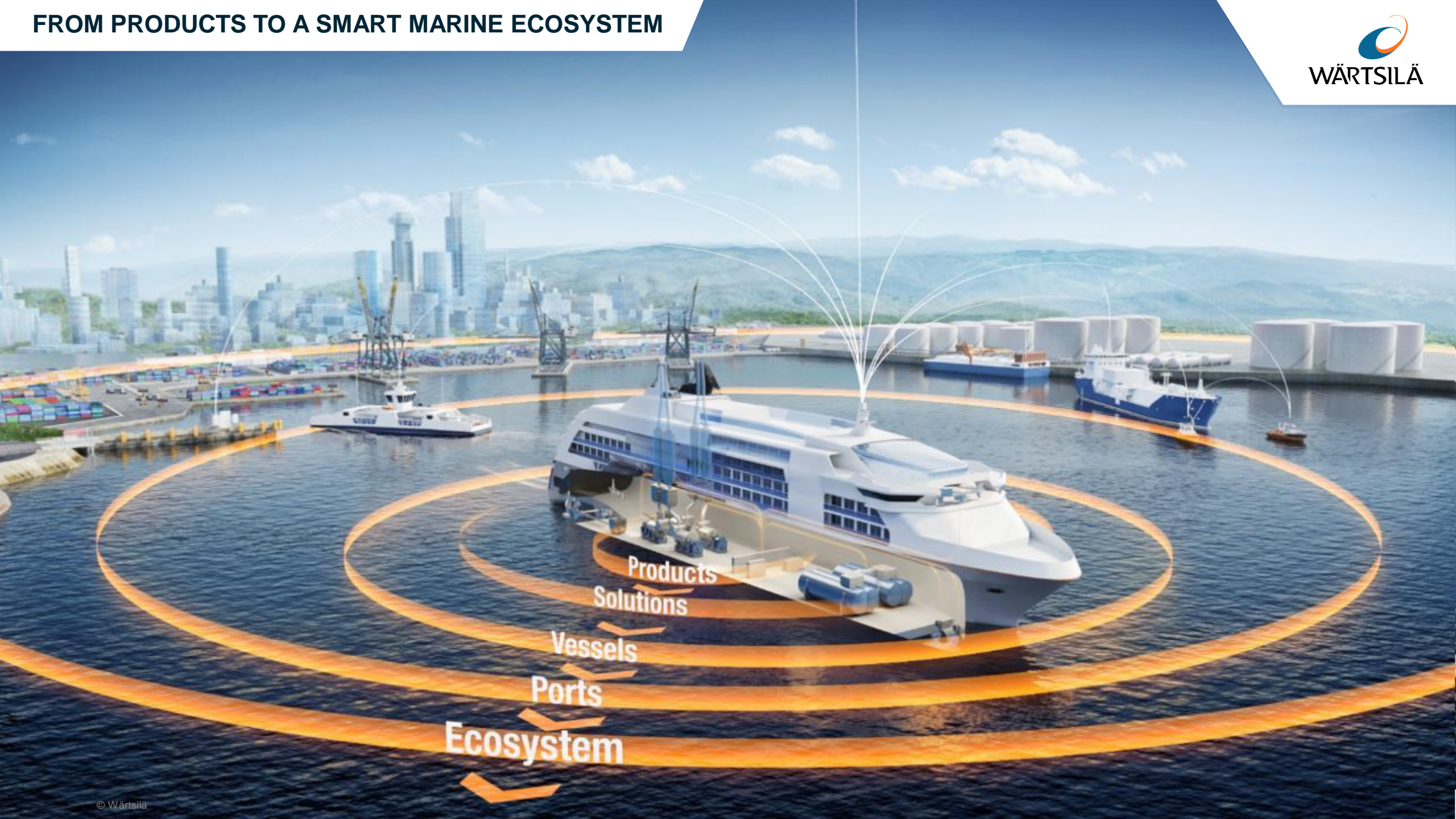


**Smart
vessels**



**Automated
ports**

FROM PRODUCTS TO A SMART MARINE ECOSYSTEM



Products
Solutions
Vessels
Ports
Ecosystem

SMART MARINE ECOSYSTEM





Efficient use
of resources



Least climate
impact



Highest
safety

REMOTE CONTROL

In August 2017, operations of a OSV sailing off the coast of Aberdeen were controlled remotely from San Diego, 8000 km away, using standard bandwidth (<75 kb) onboard satellite communication

The retrofitting of the DP software was completed within just 30 hours



AUTOMATED DOCK-TO-DOCK

Auto-docking/undocking/dock-to-dock tests on Norwegian powered car ferry Folgefonn in 2018

Combination of auto-docking and wireless charging

Autonomous operations utilised uninterrupted for the entire route, visiting all three ports serviced by the ship at no time the captain was in manual control

<https://www.wartsila.com/media/news/28-11-2018-wartsila-achieves-notable-advances-in-automated-shipping-with-latest-successful-tests-2332144>

Wärtsilä achieves notable advances in automated shipping with latest successful tests

Wärtsilä Corporation

Press release

28 November 2018 at 2:00 PM E. Europe Standard Time



The technology group Wärtsilä has successfully completed a further round of test procedures of its automated dock-to-dock solution. In an unprecedented operation, in the presence of the Norwegian Maritime Authority (NMA), the system was further tested on the ferry 'Folgefonn', this time for full dock-to-dock capability, with the autonomous operation being utilised uninterrupted for the entire route, visiting all three ports serviced by the ship.

"This represents a huge step forward in validating automated shipping solutions, and an important progression within our Smart Marine programme. This emphasises once again Wärtsilä's recognised position as the global technology leader in marine innovations. We continue to lead the way in developing the 'intelligent' products and systems needed to move the marine industry towards a new era of super-high efficiency, safety, and environmental sustainability," says Joonas Mäkkönen, Vice President, Voyage Solutions, Wärtsilä.

The success of these latest tests cannot be underestimated. Once the operator selected the next destination berth, the operation was started by simply selecting "Sail", which authorises the autonomous controller to take control of the vessel. The ferry was able to leave the dock, manoeuvre out of the harbour, sail to the next port of call, manoeuvre through the harbour entrance, and dock alongside the terminal – all without human intervention. It is believed to be the first ever attempt at fully automated dock-to-dock operation, in complete hands-off mode, for a vessel of this size.

Navigation of the vessel is controlled through the use of a series of tracks and waypoints, which guide the ship to the next destination. The autonomous controller, which is based on Wärtsilä's existing Dynamic Positioning system, controls the vessel's speed, position on the pre-defined track, and heading. GNSS is

ADVANCED INTELLIGENT ROUTING (AIR)

Automatic route planning based on meteocean data, traffic separation schemes and regional regulations on acceptable fuel types, using artificial intelligence technologies

- Fastest and safest route, including real-time updates
- Weather optimization
- Up to 5-7% fuel savings
- Reduced bridge crew workload
- Safety check and Voyage plan documentation
- Enables Just-In-Time arrival at the port



VOYAGE OPTIMISATION



FOSSIL
FUELS

EMISSIONS AND
HIGH FUEL
CONSUMPTION

ROUTE BASED
ON HUMAN
EXPERIENCE

MANUAL
OPERATIONS

RISK OF
ACCIDENTS

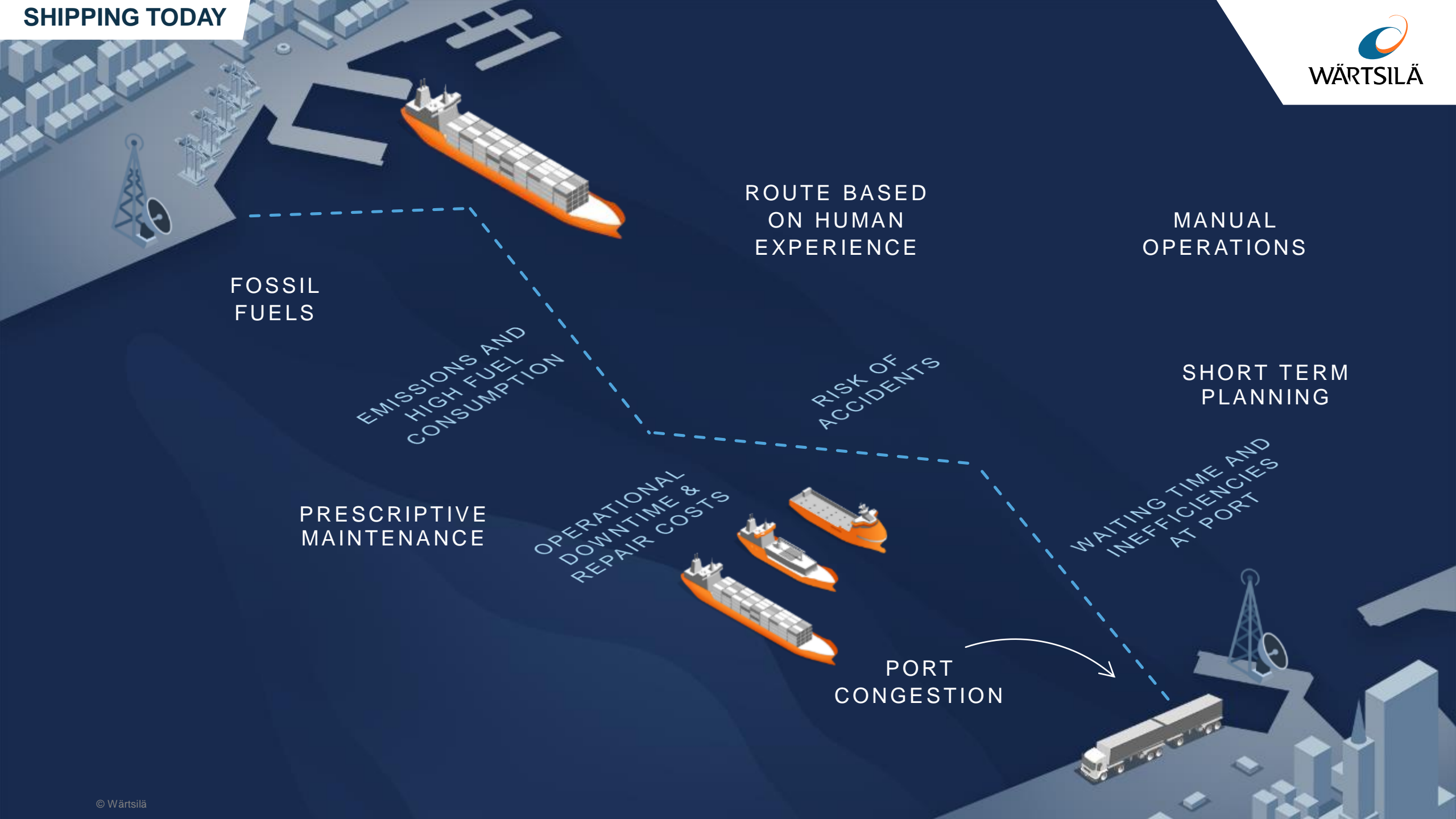
SHORT TERM
PLANNING

PRESCRIPTIVE
MAINTENANCE

OPERATIONAL
DOWNTIME &
REPAIR COSTS

WAITING TIME AND
INEFFICIENCIES
AT PORT

PORT
CONGESTION



Saving per voyage with just-in-time arrival:

74.5 tons of fuel*

22,200 EUR**



CASE:
5,500 TEU Containership
Distance: 1,150 Nautical Miles

* Assuming average SFOC : 230 g/kwh

** Assuming fuel price: 300 EUR/t

THE VOYAGE OF THE FUTURE REQUIRES AN INDUSTRY TRANSFORMATION

CONNECTED TO
ECOSYSTEM

REAL TIME SLOT
INFORMATION

OPTIMISED OPERATION

AVOID CONGESTION

ARRIVE TO PORT JUST
IN TIME

OPEX SAVINGS

* Wärtsilä case study from one major port identified the range of 100-200 million euros per year of total fuel savings and CO₂ emission reduction potential in the range of 1-2 millions of tons per year

THE FUTURE IS NOW!





WÄRTSILÄ